TYPE M EDGEWOUND RESISTORS

INSTRUCTIONS

General Information

The capacity of resistors depends largely upon the ventilating space. The frames should never be stacked more than 4 high, and, when space is available, each frame should be separated from the next by approximately the width of the end frame. Frames may be mounted on the floor, platform or on the wall, but in such a way as to obtain free ventilation.

Resistors should be given periodical inspections, that include the tightening of loose lock nuts, connections, etc. The collection of dirt and dust should be blown out from between the resistor units.

Westinghouse standard resistors, for starting and regulating the speed of motors, are rated in accordance with the National Electrical Manufacturers' Association Classification, shown in Table I. The name plates, on Westinghouse resistors specify horsepower and class numbers, which, if used in conjunction with Table I, indicate the rating of the resistor and the starting torque and current that will be obtained on the first point of the controller in per cent of full load.

TABLE I

Table I shows forty-two classes of resistors, but experience has shown that the requirements of practically all industrial applications can be met by classes 93, 95, 134, 135, 152, 153, 162 and 163.

Resistors for D-C. Motors

Resistors for D-C. motors may have one or more frames and the name plates should always be checked to see that all frames have been received. After connecting frames in series by connecting

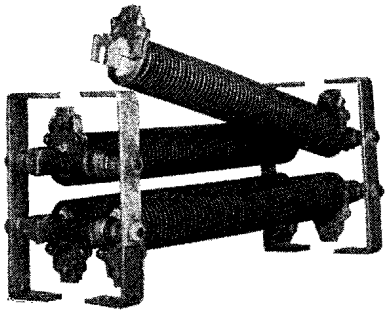

FIG. 1—TYPE M EDGEWOUND RESISTOR

A to A, B to B, etc., the resistor should be connected to the controller in line with the diagram inside of the controller cover. Fig. 3 shows resistor connections for a D-C. motor, for the specific case of a five-point resistor consisting of two frames.

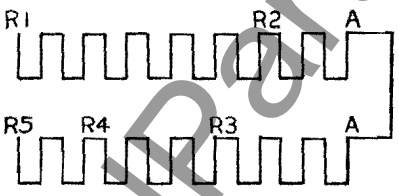

FIG. 2—RESISTOR CONNECTIONS FOR D-C. MOTORS

Resistors for A-C. Motors

All standard A-C. wound rotor motors, whether for two or three phase circuits, have their secondaries wound for three phase. The resistors, for each phase, used with these motors are identical with the exception of the terminal marking. The resistor for the first phase has its terminals marked consecutively R-1, R-2, R-3, etc.; the second phase, R-11, R-12, R-13, etc.; the third phase, R-21, R-22, R-23, etc. The actual resistor will consist of 1, 2, 3 or multiples of three frames of tubes or grids. Check name plate to see if all frames have been received. When two frames are furnished, they should be connected in series by connecting terminals A to A. When three frames are furnished, this connection is not required. When more than three frames are supplied, sort out the frames for each phase according to the terminal marking, and connect those frames belonging to each phase by connecting A to A, B to B, etc. Make all other connections in line with the following information and the diagram located in controller cover.

Secondary resistors for A-C. motors are designed for star connection. Resistors for most manual controllers may be connected either with all three secondary phases closed or with one secondary phase open on the first point of the controller. Resistors for magnetic controllers are connected with all three phases closed in the secondary on the first point.

The torque obtained with a resistor of a given class number varies with the connection used on the first connection. The torques available on the first point with single phase and three phase starting are shown in Table 1. Where it is possible to use both methods of connection, the control diagram shows one method of connection, and explains how to obtain the other method. The method actually shown on the diagram is ordinarily recommended, but if a change in starting torque is desirable, the other method may be used.

TABLE I—N. E. M. A. CLASSIFICATION

Per cent Full Load Current on First Point	**STARTING TORQUE % OF FULL LOAD					RESISTOR CLASS NUMBER						
	Series Motors	Comp'd Motors	Shunt Motors	Wound Rotor Induction Motors								
				1 Ph. Stg.	3 Ph. Stg.	5 Sec. on out of 80 Sec.	10 Sec. on out of 80 Sec.	15 Sec. on out of 90 Sec.	15 Sec. on out of 60 Sec.	15 Sec. on out of 45 Sec.	15 Sec. on out of 30 Sec.	Cont.
25	8	12	25	15	25	111	131	141	151	161	171	91
30	30	40	50	30	50	112	132	142	152	162	172	92
70	50	60	70	40	70	113	133	143	153	163	173	93
00	100	100	100	55	100	114	134	144	154	164	174	94
150	170	160	150	85	150	115	135	145	155	165	175	95
200	250	230	200	..	200	116	136	146	156	166	176	96

**Based on Westinghouse Motors.
The letter D indicates additional capacity for dynamic lowering.
The letter B added to any class indicates additional step for dynamic braking.

TYPE M EDGEWOUND RESISTORS

RENEWAL PARTS DATA

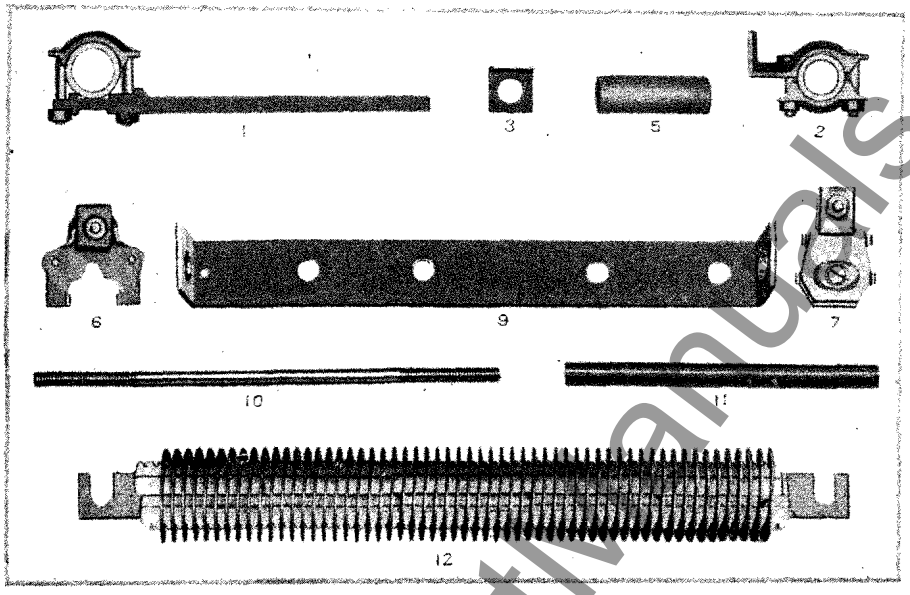

FIG. 3—RENEWAL PARTS FOR TYPE M EDGEWOUND RESISTORS.

Ref. No.	Name of Part	Style No.	‡Ref. No. 8 Supporting Strap for Pipe Mounting	
			Length	Style No.
1	Straight Bracket for Pipe Mounting	228887	13¼″	587654
2	Angle Bracket for Pipe Mounting	386302	15¼″	587655
3	Locking Washer	459785	17¼″	587656
‡4	Mica Washer	459798	19¼″	587657
5	Spacer, ¾″ long	404014	23¼″	587658
5	Spacer, 1″ long	79372	27¼″	586402
5	Spacer, 1½″ long	404016	31¼″	587660
5	Spacer, 2½″ long	404017	33¼″	773819
‡‡6	Terminal, Single	459990	35¼″	587659
△6	Terminal, Single	475520	39¼″	773820
7	Terminal, Double	508044	48¼″	773818

Ref. No. 9 End Frame		Ref. No. 10 Tie Rod		Ref. No. 11 Insulating Tube for Tie Rod			
Length	Style No.	Length	Style No.	Length	Style No.	Length	Style No.
4¼″	490264	3½″	466615	1¼″	490262	14½″	292654
7⅞″	490263	7 ″	508247	2½″	317501	15½″	292656
12 ″	591271	10½″	388995	4 ″	439566	17 ″	292659
16 ″	591270	13 ″	461442	5½″	285778	18½″	292662
24 ″	591269	15½″	292629	7 ″	292639	20 ″	292665
		18½″	292632	8½″	292642	21½″	292668
		21½″	461450	10 ″	292645	23 ″	292671
		24½″	461453	11½″	292648	24½″	292674
		27 ″	461457	13 ″	292651		

Ref. No. 12—Resistor Unit. It is recommended that 5% of the total number of Resistor Units in use be carried in Stock for Renewals, and where the total of Resistor Units in use is less than 20, one of each style Unit should be carried. When ordering specify Name Plate Reading attached to each Unit.

‡Not illustrated.
‡‡Used with ″.102 Diameter (# 10) Wire.
△Used with ″.204 Diameter (# 4) Wire.

ORDERING INSTRUCTIONS

Name the part and give its style number. Give the complete name plate reading. State whether shipment is desired by express, freight or by parcel post. Send all orders or correspondence to the nearest sales office of the company. Small orders should be combined so as to amount to a value of at least one dollar net. Where the total of the sale is less than this, the material will be invoiced at $1.00.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Printed in U.S.A.
(Rep. 7-37)

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Instructions for Type M Edgewound Resistors

I.L. 1733-C

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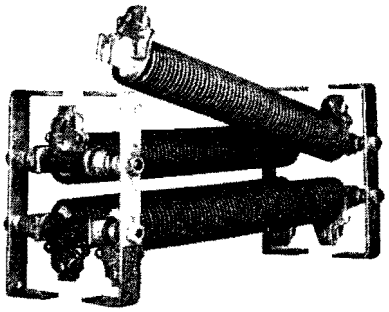

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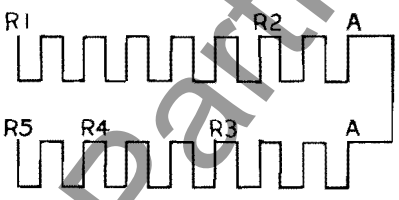

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**Based on Westinghouse Motors.

The letter DL indicates additional capacity for dynamic lowering.

The letter DB added to any class indicates additional step for dynamic braking.

Westinghouse Electric Corporation
Control Division
Asheville, N. C. 28813

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